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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,469	12/27/2001	Charles A. Miller	2026.0030000	7774

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EXAMINER

DATSKOVSKIY, MICHAEL V

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 05/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/026,469

Applicant(s)

MILLER, CHARLES A.

Examiner

Michael V Datskovskiy

Art Unit

2835

-- The MAILING DATE f this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-8,16,17,20,21,23-26,32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 17,20,21,25 and 26 is/are allowed.
- 6) ☐ Claim(s) 5-8,16,23-24,32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment with respect to the claim 6 and arguments, see Amendment and Remarks, filed 04/26/2004, with respect to the claims 5-8, 16-17, 20-21 and 23-26 have been fully considered and are sufficient and persuasive. The Rejection under 35 USC §112 of the claim 6 and § 103 of the claims 5-8, 16-17, 20-21 and 23-26 has been withdrawn. However, due to the further consideration and newly found references a following new non-final rejection is presented:

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 5-8, 16, 23-24, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patel et al in view of Dozier, II et al.

Patel et al teach a cooling assembly comprising: an electronic package 405, Figs. 5-6, having a cavity 409; a plurality of dies 401; a bottom substrate 403, wherein active electronic components face the bottom surface 403 and a coolant surrounding interconnects within the cavity 409; an inlet 411 and an outlet 413 coolant ports that allow the coolant to enter the cavity 409, wherein each die has at least one active surface associated with respective active electronic components, and when the coolant circulated in the cavity the coolant directly cools each active surface of each die 401.

Art Unit: 2835

Patel et al teach furthermore said cooling assembly comprising a coolant circulation system coupled to said coolant ports 411 and 413, wherein the coolant circulates within the package 405 and directly contacts all surfaces of each die 401 to directly cool active electronic components during their operation. Patel et al teach furthermore said cooling assembly comprising a cooling member 509, Fig.6, and a heat radiator 507, wherein each die is immersed in the coolant and the heat radiator 507 transfers heat generated by the die 501 to said cooling member 509. Patel et al do not teach said interconnects being compliant and comprising lithographic springs. Dozier, II et al teach an IC photo lithographically patterned spring contact, Fig.2, which along with being compliant also creates a gap between the active surface of the die and the substrate at it is a case in the device by Patel et al. It would have been obvious to one skilled in the art at the time invention was made to employ an IC photo lithographically patterned spring interconnects as they taught by Smith et al in the device by Tilton et al in order to further decrease mechanical stress caused by thermal expansion of the components (to reduce thermal gradients on each active surface of each die).

Allowable Subject Matter

4. Claims 17, 20-21 and 25-26 are allowed.
5. The following is a statement of reasons for the indication of allowable subject matter: A combination of the structure claimed in claim 16, wherein said interconnects comprise first and second sets of compliant interconnects, the package further comprises a top substrate, and alignment posts attached to the bottom substrate (claim 17); The package further comprises a top substrate with a top surface

Art Unit: 2835

representing an exterior surface of the package (claim 20); The package further comprises a top substrate, a bottom substrate and interconnection elements providing electrical path extending from the top substrate and the bottom substrate (claim 21); At least one non-contacting compliant interconnect coupled to a surface of said die, whereby heat can be further directed away from the surface of said die (claim 25); and The package further comprises a top substrate, a bottom substrate, wherein each die is flip-chip bounded to said top substrate (claim 26).


6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Cray et al (US Patent 5,054,192); Eldridge et al (US Patent 6,727,580) and Mathieu et al (US Patent 6,268,015).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on ((571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2835

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


05/05/04

Michael V Datskovskiy
Primary Examiner
Art Unit 2835